APPLICATION GUIDELINES FOR ELECTRIC DOUBLE LAYER CAPACITORS "EVerCAP®"

1.Circuit Design

(1) The EDLC has a specified endurance and an end of life.

(2) The EDLC has a maximum temperature.

(3) Electrical characteristics of the EDLC change depending on the ambient temperature.

(4) Electrical characteristics of the EDLC can be adversely affected by increasing temperature.

(5) The voltage held by the EDLC drops after discharge, depending on the discharging current and the internal resistance of the EDLC.

(6) Please note that if high ripple current, high pulse current and/or high charge & discharge currents are applied to a capacitor, greater deterioration than you expect to the capacitor may occur due to internal temperature rise of self-heat generation.

(7) Outer sleeve of the EDLC is not guaranteed as an electrical insulator.

(8) Capacitance of the EDLC is measured by the D.C. discharging method and differs from the one used for other capacitors, and is based on EIAJ RC-2377.

(9) Active or passive voltage balancing is needed to ensure uniform voltage distribution across each EDLC, if EDLCs are connected in series to gain higher rated voltage.

(10) Do not expose the EDLC to following conditions.

① Environmental (climatic) comditions
(a) Being exposed to water, high temperature & high humidity atmosphere, or condensation of moisture.
(b) Being exposed to oil or an atmosphere that is filled with particles of oil.
(c) Being exposed to salty water or an atmosphere that is filled with particles of salt.
(d) In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, ammonia, etc.)
(e) Being exposed to direct sunlight, ozone, ultraviolet ray, or radication.
(f) Being exposed to acidic or alkaline solutions.

② Under severe conditions where vibration and / or mechanical shock excced the applicable ranges of the specifications.

(11) Do not use the EDLC above the voltage and temperature specified in the data sheet, otherwise the EDLC may be electrically damaged or in worst case, will fail completely.

(12) Do not apply reverse-voltage as the EDLC is polarised.

(13) When designing a P.C. board, please pay attention to the following:

① Have the hole spacing on the P.C. board match the lead spacing of the capacitor.
② There should not be any circuit pattern or circuit wire above the capacitor pressure relief vent.
③ Unless otherwise specified, following clearance should be made above the pressure relief vent.

Case Diameter	Clearance Required
φ 6.3~16	2mm or more
φ 18~35	3mm or more
φ 40 or more	5mm or more

④ In case the vent side is placed toward P.C. board (such as end seal vented parts), make a corresponding hole on the P.C. board to release the gas when vent is operated. The hole should be made to match the capacitor vent position.
⑤ Screw terminal capacitors must be installed with their end seal side facing up. When you install a screw terminal capacitor in a horizontal position, the positive terminal must be in the upper position.

(14) The main chemical solution of the electrolyte and the separator paper used in the capacitors are combustible. The electrolyte is conductive. When it comes in contact with the P.C. board, there is a possibility of pattern corrosion or short circuit between the circuit pattern which could result in smoking or catching fire.
Do not locate any circuit pattern beneath the capacitor end seal.

(15) Do not design a circuit board so that heat generating components are placed near an aluminum electrolytic capacitor or reverse side of P.C. board (under the capacitor).

(16) When you mount capacitors on the double-sided P.C. boards, do not place capacitors on circuit patterns or over on unused holes.

(17) The torque for terminal screw or brackets screws shall be within the specified value on Nichicon's drawings.

2.Mounting

(1) Please confirm polarity before in stalling capacitors on the P.C. board.

(2) Do not drop capacitors on the floor, nor use a capacitor that was dropped.

(3) Do not damage the capacitor while installing.

(4) Please confirm that the lead spacing of the capacitor matches the hole spacing of the P.C. board prior to installation.

(5) Snap-in can type capacitor such as JIS style symbol 692 type should be installed tightly to the P.C. board (allow no gap between the P.C. board an bottom of the capacitor).

(6) Hand soldering.

①Soldering condition shall be confirmed to be within the specification.
②If it is necessary that the leads must be formed due to a mismatch of the lead space to hole space on the board, bend the lead prior to soldering without applying too much stress to the capacitor.
③If you need to remove parts which were soldered, please melt the solder enough so that stress is not applied to lead.
④Please pay attention so that solder iron does not touch any portion of capacitor body.

(7) Flow soldering (Wave solder)

①Aluminum capacitor body must not be submerged into the solder bath. Aluminum capacitors must be mounted on the "top side" of the P.C. board and only allow the bottom side of the P.C. board to come in contact with the solder.
②Soldering condition must be confirmed to be within Nichicon specification.
Solder temperature: 260±5°C Immersing lead time:10±1 second, Thickness of P.C. board : 1.6mm.
③Please avoid having flux adhere to any portion except the terminal.
④Please avoid contact between other components and the aluminum capacitor.

(8) Do not tilt lay down or twist the capacitor body after the capacitor are soldered to the P.C. board.

(9) Do not carry the P.C. board by grasping the soldered capacitor.

(10) Please do not allow anything to touch the capacitor after soldering. If P.C. board are stored in a stack, please make sure P.C. board or the other components do not touch the capacitor.
The capacitors shall not be effected by any radiated heat from the soldered P.C. board or other components after soldering.

3.Storage

(1) It is recommended to keep the EDLC under the ambient temperature of 5°C to 35°C and a relative humidity of 75% or below.

(2) Confirm that the environment does not have any of the following conditions :

① Where the EDLC is exposed to water, high temperature & high humidity atmosphere, or condensation of moisture
② Where the EDLC is exposed to oil or an atmosphere that is filled with particles of oil.
③ Where the EDLC is exposed to salty water, high temperature & high humidity atmosphere, or condensation of moisture
④ The atmosphere is filled with toxic acid gasses
(e.g. hydrogen sulfide, sulfurous acid, nitrous acid, chlorine, bromine, methyl bromide, etc.)
⑤ The atmosphere is filled with toxic alkaline gasses. (e.g. ammonia)
⑥ Where the EDLC is exposed to acidic or alkaline solutions

4.Disposal

(1) Take the following methods in disposing of the EDLC,
hand them over to a waste disposal agent.

The above mentioned material is according to EIAJ RCR-2370A (issued in March 2002), titled "Gideline of notabilia for fixed electric double layer capacitors" Please refer to the book for details.